

## SLIDE LOCK WRENCH

### BACKGROUND OF THE INVENTION

#### 1. Field of the Invention

This invention relates to wrenches and, more particularly, to wrenches which  
5 are usable to handle various types and sizes of hexagonal, square and round work pieces, particularly, nuts, bolts, pipes and pipe fittings.

#### 2. Description of the Prior Art

A variety of hand tools have been utilized with the installation of nuts, bolts,  
pipes and pipe fittings. Wrench-type and plier-type hand tools are commonly used to  
10 handle nuts, bolts, pipes and pipe fittings. See, for example, the tools shown in United States Patents Nos. 994,070 ; 1,027,203 ; 1,199,806 ; 2,592,927 ; 3,968,708 ; 3,955,450 ; 2,882,774 ; 993,504 ; 1,586,513 ; 4,616,536 ; and 1,396,576.

However, the use of these prior art tools to install or remove nuts, bolts, pipes  
and pipe fittings is disadvantageous for numerous reasons. First, the opposing jaw  
15 areas allow a loose application at only two surfaces of the nuts and bolts of various sizes and shapes. In addition, these tools do not provide a uniform holding grip on the nuts or bolts. Further, these tools require a laborious task of repetitious mechanical adjustment and employing the use of various thumb and finger type devices to move the jaws of the tools to encompass the nuts and bolts. The same  
20 laborious task of repetitious mechanical adjustment is required to open the jaws to receive the nuts and bolts of various sizes and shapes. In the installation or removal of pipes and pipe fittings, the tools presently in use also require a laborious task of repetitious mechanical adjustment, employing the use of various thumb and finger type devices, to move the jaws of the tools to grasp the various sizes of pipes and  
25 pipe fittings. The same laborious task of repetitious mechanical adjustment is also required to open the jaws to receive the pipes and pipe fittings of various sizes and shapes.

Accordingly, it is the object of the present invention to provide wrenches for handling nuts, bolts, pipes and pipe fittings, which can be used to tighten or loosen the nuts, bolts, pipes and pipe fittings, with a uniform holding grip, without the laborious task of repetitious mechanical adjustment. It is another object of the invention to provide wrenches which can be easily used in a confined environment without damage to the nuts, bolts, pipes and pipe fittings themselves.

### SUMMARY OF THE INVENTION

The present invention provides a wrench hand tool for the installation and removal of nuts, bolts, pipes, pipe fittings, rods and bars, with a uniform positive gripping action, without the laborious task of a repetitious mechanical adjustment as required by the wrench-type and plier-type hand tools of prior art.

### BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view of the wrench according to the present invention;

Fig. 2 is a perspective view of a second embodiment of the wrench according to the present invention;

Fig. 3 is a front view of the wrench shown in Fig. 1 grasping a hexagon shaped nut;

Fig. 4 is a right side view of the wrench shown in Fig. 3;

Fig. 5 is a left side view of the wrench shown in Fig. 3;

Fig. 6 is a front view of the wrench as shown in Fig. 2 grasping a circular object;

Fig. 7 is a right side view of the wrench shown in Fig. 6;

Fig. 8 is a left side view of the wrench shown in Fig. 6;

Fig. 9 is a front view of a third embodiment of the wrench, grasping a hexagon shaped nut, according to the present invention;

Fig. 10 is a right side view of the wrench shown in Fig. 9;

Fig. 11 is a left side view of the wrench shown in Fig. 9;

Fig. 12 is a front view of a fourth embodiment of the wrench, grasping a hexagon shaped nut, according to the present invention;

Fig. 13 is a right side view of the wrench shown in Fig. 12;

Fig. 14 is a left side view of the wrench shown in Fig. 12;

5 Fig. 15 is a top view of the wrench shown in Fig. 3;

Fig. 16 is a bottom view of the wrench shown in Fig. 3;

Fig. 17 is a top view of the wrench shown in Fig. 6;

Fig. 18 is a bottom view of the wrench shown in Fig. 6;

Fig. 19 is a top view of the wrench shown in Fig. 9;

10 Fig. 20 is a bottom view of the wrench shown in Fig. 9;

Fig. 21 is a top view of the wrench shown in Fig. 12;

Fig. 22 is a bottom view of the wrench shown in Fig. 12;

Fig. 23 is a sectional view of Fig. 24;

Fig. 24 is a left side view of Fig. 23;

15 Fig. 25 is a sectional view of Fig. 26;

Fig. 26 is a left side view of Fig. 25;

Fig. 27 is a sectional view of Fig. 3;

Fig. 28 is a sectional view of Fig. 6;

Fig. 29 is an enlarged view of Fig. 27 and Fig. 28;

20 Fig. 30 displays hexagon shaped nuts and pipe fittings of several sizes;

Fig. 31 displays bolts and pipes of several sizes.

## DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to Figs. {1-31}, there is shown a wrench {1} for handling hex angular nuts {30} and hex angular bolts {31}, as shown in Figs. 1, 3, 4, 5, 15, 16, 23, 24, 27, 29, 30 and 31. The wrench {1} includes a body {2}, a pivoted lever handle {3}, an upper angular gripping {movable} jaw {4}, a lower angular gripping movable jaw {5}, and a serrated thumb slide {6}. The body {2} and the pivoted handle {3} may have plastic or other composition hand grips {7} there about which permit comfortable control of the wrench ( ). The pivoted lever handle {3}, having a cam means {29}, is attached to the body {2} by a pivot {8}. The angular jaw {4} and the angular jaw {5} are oriented to securely grasp a nut {30} or bolt {31} on four surfaces of the {workpiece} there between. The wrench {1} may be constructed of drop-forged steel, stamped metal, powdered metal or other adequate strength materials.

The wrench ( ) is usable to tighten or loosen nuts {30} and bolts {31} by moving the jaw {4} toward the jaw {5}, thereby grasping the nut {30} or bolt {31} therein. The jaw {4} may be moved toward the jaw {5} by applying force to the jaw {4} on the serrated areas {9} or {10}, by sliding the serrated thumb pull {6} or by cranking the handle {3} towards the body {2}. Referring to Figs. 23 and 29, the handle {3} is held in a neutral position by a retaining spring {33}. Cranking the handle {3} towards the body {2} causes the pivot {43} to move the link {45} in a downward motion causing the pivoted notched device {35}, which is held in constant position against the outer side surface {racheted} teeth {48} of the upper jaw {4} by the retaining spring {34}, to move the jaw {4} to the desired position towards the jaw 5 to engage the nut {30} or bolt {31}. Moving the jaw {4} towards the jaw {5} causes the notched dog {36}, which is also held in constant position by the retaining spring {34}, to engage the {ratchet} teeth {48} on the jaw {4} thereby locking the jaw {4} in a positive position. Grasping the handle {3} toward the body {2}, while the jaw {4} is in a locked position, causes a cam lever action at the end portion {29} of the handle {3} against the jaw {5} thereby

causing a positive gripping force against the nut {30} or the bolt {31}. The nut {30} or bolt {31} may then be rotated clockwise or counterclockwise without inverting the wrench ( ). Releasing the grasp on the handle {3} and moving the handle {3} away from the body {2} beyond the neutral position, allows the pivot pin {44} to move the link {46} away from the body {2} and pulls the pivot pin {40} on the notched dog {36}, which revolves on pivot pin {39}, thus moving the notched dog {36} away from the {notches} {48} and simultaneously allows the pivot pin {43} to move the link {45} away from the body {2} and pulls the pivot pin {38} on the notched device {35} thus moving the notched device {35} away from the {notches} {48} thus allowing the compression spring {42} to return the jaw {4} to a fully open position.

The upper portion of jaws {4} and {5} are formed substantially as hex angular gripping surface areas {16}, divided by circular grooves {15}, to accommodate obtrusive irregularities on the outside corners of some hex angular nuts and bolts. The hex angular gripping surface areas {16} are arranged to grasp the angular surfaces of hex angular nuts {30} and bolts {31} as shown in Figs. 3, 30 and 31. The jaw {5} contains thereon alignment appendages {11} which allows the jaw {5} to move {laterally} in the alignment slits {12} thus allowing the cam action {29} to tighten the jaw {5} against the nut {30} or bolt {31} as shown in Fig. 3. The jaw {4} contains therein alignment slits {47}, which ride along the alignment pins {14} to maintain alignment of the jaw {4} as it travels back and forth in the body pocket chamber {37} as {the dog} {36} and notched device {35} engage or disengage the {ratchet} teeth {48} on the jaw {4} as shown in Figs. 23, 27 and 29. The lower body portion contains therein a body chamber {37} to house a coil spring {42} to maintain constant pressure against the lower portion of jaw {4} as shown in Figs. 23, 27 and 29.

The first preferred embodiment of the wrench ( ) is fully described above. A second preferred embodiment of the wrench {1} for handling pipes {49} and pipe fittings {50} is shown in Figs. 2, 6, 7, 8, 17, 18, 25, 26, 28 [and] 29, 30 and 31. The

wrench {1} includes a body {2}, a pivoted lever handle {3} and serrated gripping surfaces {21} on jaws {17} and {18} for grasping pipes {49} and pipe fittings {50}. The wrench ( ) is usable to tighten or loosen pipes {49} and pipe fittings {50} by moving the jaw {17} toward the jaw {18}, thereby grasping the pipes {49} and pipe fittings {50} therein. The jaw {17} may be moved toward the jaw {18} by applying force to the jaw {17} on the serrated areas {19} or {20}, by sliding the serrated thumb pull {6} or by cranking the handle {3} towards the body {2}. When the jaws {17} and {18} engage the pipe {49} or pipe fitting {50}, grasping the handle {3} towards the body {2} causes the cam lever action at the end portion {29} thereby causing a positive tightening of the jaw {18} against the jaw {17} thus causing a positive gripping force on the pipe {49} or pipe fitting {50}. Releasing the grasp on the handle 3, allows the wrench ( ) to rotate on the pipe {49} or fitting {50} in a repetitive manner without removing the wrench ( ) from the {workpiece}. Removing the pipes {49} and pipe fittings {50} is accomplished by inverting the wrench ( ) on the pipes {49} and pipe fittings {50} and rotating the wrench ( ) in a counterclockwise direction thus removing the {workpiece}.

A third preferred embodiment of the wrench {1} for handling hex angular nuts is shown in Figs. 9, 10, 11, 19, 20, 30 and 31. The wrench ( ) includes a body {2}, a pivoted lever handle {3}, serrated angular gripping surfaces {24} on movable jaws {22} and {23} for grasping damaged or irregular shaped objects such as, but not limited to, nuts, bolts, pipes, fittings, rods and bars. The wrench ( ) is usable to tighten or loosen {workpieces} by moving the jaw {22} toward the jaw {23}, thereby grasping the {workpiece} therein. The jaw {22} may be moved toward the jaw {23} by applying force to the jaw {22} on the serrated areas {9} or {10}, by sliding the serrated thumb pull {6}, or by cranking the handle {3} towards the body {2}. When the jaws {22} and {23} engage the {workpiece}, grasping the lever handle {3} towards the body {2} causes a cam lever action at the end portion {29} against jaw {24} thereby causing a positive gripping force against the {workpiece}. The {workpiece} may then be rotated

clockwise or counterclockwise without inverting the wrench ( ).

A fourth preferred embodiment of the wrench {1} for handling hex angular and square nuts as shown in Figs. 12, 13, 14, 21, 22, 30 and 31. The wrench {1} includes a body {2}, a pivoted lever handle {3}, opposing parallel aligned (flat) gripping

5 surfaces {27} on movable jaws {25} and {26} for grasping hex angular and square nuts. The wrench ( ) is usable to tighten or loosen {workpieces} by moving the jaw {25} toward the jaw {26}, thereby grasping the {workpiece} therein. The jaw {25} may be moved toward the jaw {26} by applying force to the jaw {25} on the serrated area {28}, by sliding the serrated thumb pull {6}, or by cranking the handle {3} towards the  
10 body {2}. When the jaws {25} and {26} engage the {workpiece}, grasping the handle {3} towards the body {2} causes the cam lever action at the end portion {29} against jaw {26} thereby causing a positive gripping force against the workpiece. The {workpiece} may then be rotated clockwise or counterclockwise without inverting the wrench ( ).

15 Having described above the presently preferred embodiments of the present invention, it is to be understood that the invention may be otherwise embodied within the scope of the appended claims.